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CHEMICAL CONTROL OF UNWANTED HARDWOODS

Charles X Grano  
Southern Forest Experiment Station

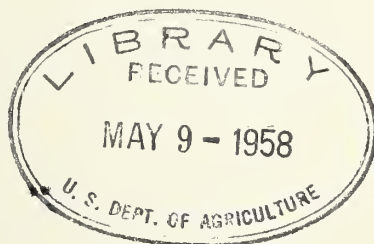
This is a brief summary of the results obtained on experiments utilizing chemicals to control hardwoods at the Crossett Branch Station at Crossett, Arkansas.

Girdling has long been used to kill unwanted hardwoods in mixed stands where the release of pine was desired. Unfortunately, most small hardwoods sprout vigorously when girdled, which often creates a release problem itself. This problem stimulated the search for poisons which would effectively kill weed hardwoods and at the same time either greatly reduce or eliminate sprouting. From a practical standpoint the poisons had to be cheap, easy to apply, and non-toxic to human beings and animals.

Some of the most promising poisons are Ammate, 2,4,5-T, and 2,4-D and 2,4,5-T in combination. All of these are now marketed commercially and are easily available to the consumer.

Use of 2,4-D and 2,4,5-T

2,4,5-T (Trichlorophenoxyacetic acid) and 2,4-D (Dichlorophenoxyacetic acid) have been used alone and in combination. They come in concentrated liquid form and are readily diluted with water and fuel oil. A test of these chemicals was established in May and June 1951. The mortality and sprout control obtained with these chemicals using various concentrations, carriers, and methods of application are given in the following table:





Effect of 2,4,5-T on red oak 3 to 11 inches d.b.h.

Treatment <u>1</u>	: Dead : Percent	: Sprouting
<u>2,4,5-T (2% in water) in frill</u>		
5 months after treatment	95	13
17 months after treatment	100	2
29 months after treatment	100	0
<u>2,4,5-T (1% in water) in frill</u>		
5 months after treatment	95	6
17 months after treatment	100	2
29 months after treatment	100	2
<u>Cut all - spray stumps with 2,4,5-T (5% in oil)</u>		
5 months after treatment	100	5
17 months after treatment	100	7
29 months after treatment	100	2
<u>Spray butt 18" with 2,4,5-T (5% in oil)</u>		
5 months after treatment	5	0
17 months after treatment	10	0
29 months after treatment	10	0

Effect of 2,4,5-T on red oak 1 and 2 inches d.b.h.

Treatment	: Sprouting: Percent	: Sprout height Feet	: Sprout width Feet
<u>Cut stem, treat stump with 2,4,5-T (2% in water)</u>			
5 months after treatment	62	..	..
17 months after treatment	43	..	..
29 months after treatment	28	3	2
<u>Cut stem, treat stump with 2,4,5-T (1% in water)</u>			
5 months after treatment	52	..	..
17 months after treatment	37	..	..
29 months after treatment	33	3	2
<u>Cut stem, treat stump with 2,4,5-T (5% in oil)</u>			
5 months after treatment	7	..	..
17 months after treatment	23	..	..
29 months after treatment	13	3	2
<u>Spray butt 18" with 2,4,5-T (5% in oil)<sup>2/</sup></u>			
5 months after treatment	0	..	..
17 months after treatment	20	..	..
29 months after treatment	13	1	1

<sup>1/</sup> Solution percent is by volume.<sup>2/</sup> Mortality was low for this treatment.





It was suspected that the season in which the chemicals were applied had some bearing on the effectiveness of treatment. In order to test this belief, an experiment was established in 1953 in which a one percent water mixture of 2,4,5-T was applied in frills in the fall, winter, spring, and summer. The first- and second-year results are shown in the table which follows:

Effect of season of application of 2,4,5-T on red oak 3 to 11 inches in diameter

Treatment	First year		Second year	
	Dead	Sprouting	Dead	Sprouting
	----- Percent -----			
<u>2,4,5-T (1% in water) in frill</u>				
Fall application	40	53	91	16
Winter application	44	20	100	6
Spring application	100	11	100	0
Summer application	100	71	100	29

Use of Ammate

Ammonium sulphamate or Ammate as it is commercially known, comes in the form of yellow crystals which are readily soluble in water. A test was set up in May 1950 to compare the effectiveness of several methods of Ammate application. A single-hack frill and double-hack girdle without poison were tried for purposes of comparison. Red oaks only were sampled because they are the most prevalent upland hardwoods in this area. The table below lists the various treatments used and results after 2.5 years.

Results on trees 3 to 10 inches in diameter

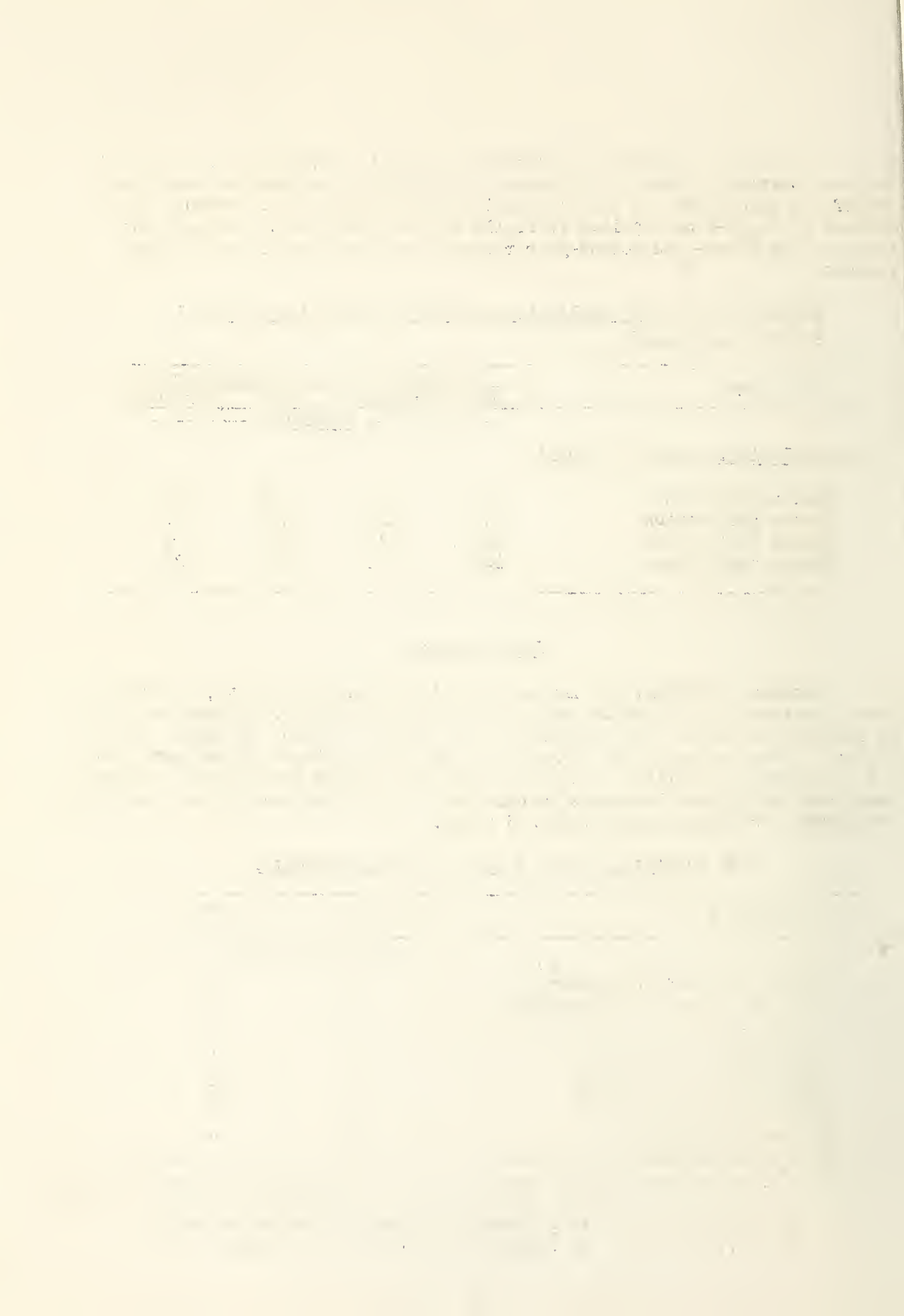
Treatments	Dead	Trees sprouting
	----- Percent -----	
Crystals in cups at ground <sup>1/</sup>	94	5
Crystals in cups at 30 inches <sup>2/</sup>	53	9
Pellets in slits at ground <sup>3/</sup>	90	0
10.7% solution in frill <sup>4/</sup>	98	6
19.3% solution in frill <sup>4/</sup>	100	12.
37.5% solution in frill <sup>4/</sup>	100	11
Single-hack frill only	93	4
Double-hack girdle only	100	8

<sup>1/</sup> Cups spaced 6" apart edge to edge. One tablespoonful Ammate per cup.

<sup>2/</sup> Cups spaced about 4" edge to edge. One tablespoonful Ammate per cup.

<sup>3/</sup> Wedge-shaped Ammate pellets equivalent to one tablespoonful.

<sup>4/</sup> 1, 2, and 5 lbs. of Ammate per gallon, respectively.



The results obtained in this test on trees 3 to 10 inches d.b.h. have been unusually good as regards the reduction in sprouting. There is a possibility that the season of the year (May) in which treatment was given may have had some bearing on the results. These results, therefore, should be tempered with those obtained on red oak on an older Ammate study which was established in November 1947. The results four years after treatment are listed below:

Treatments	Percent of trees killed	Percent of trees sprouting
Crystals in cups at ground	65	0
Crystals in cups at 30 inches	48	0
19.3% solution in frill <sup>1/</sup>	97	42
37.5% solution in frill <sup>1/</sup>	100	44
Frill only (no Ammate)	91	51

<sup>1/</sup> Two and five pounds of Ammate per gallon, respectively.

Red oaks one and two inches in diameter were treated with a Cornell tool which was jabbed into the base of the treated tree making a gash and automatically letting a fixed amount of Ammate solution flow into the wound. Three other treatments were used for comparison. The table below gives the treatments used and the results after 2.5 years:

Results on trees 1 and 2 inches in diameter

Treatments (applied in May)	Dead	Trees sprouting
	-----	Percent -----
8 lbs. Ammate per gallon, 1 & 2 gashes <sup>1/</sup>	98	18
8 lbs. Ammate per gallon, 2 & 3 gashes <sup>2/</sup>	98	5
4 lbs. Ammate per gallon, 1 & 2 gashes	93	3
4 lbs. Ammate per gallon, 2 & 3 gashes	88	14
2 lbs. Ammate per gallon, 1 & 2 gashes	43	32
2 lbs. Ammate per gallon, 2 & 3 gashes	79	11
Ammate crystals on cut off stump	100	33
Cut off stem (no Ammate)	100	68
0.6% 2,4,5-T in diesel oil, sprayed on stem	16	45

<sup>1/</sup> Trees 1-inch d.b.h. were jabbed once and 2-inch trees were jabbed twice with Cornell tool.

<sup>2/</sup> One-inch trees were jabbed twice and 2-inch trees were jabbed three times.



### Cost of treatments

The tables presented above deal only with the relative effectiveness of the various treatments. In order to make sound choice of treatment best suited for specific conditions, costs need be known.

The cost figures given in the table which follows are all based on treating 190 trees per acre, averaging 5 inches in diameter. Stands requiring less or greater hardwood removal than this must be adjusted accordingly.

### Cost of treatments per acre

<u>Treatment</u>	<u>Cost<sup>1/</sup></u>
	<u>Dollars</u>
Frill	2.76
Two-hack girdle	4.78
Ammate crystals in cups at ground	5.63
Ammate crystals in cups at 30 inches	4.92
Ammate pellets in slits at ground	4.88
10.7% Ammate solution in frill	4.80
19.3% Ammate solution in frill	5.03
37.5% Ammate solution in frill	5.73
1% 2,4,5-T water solution in frill	4.82
2% 2,4,5-T water solution in frill	5.01
1% 2,4-D and 2,4,5-T water solution in frill	4.78
2% 2,4-D and 2,4,5-T water solution in frill	4.95
Spray butt 18" (5% solution in oil)	9.49
Cut, spray stump (5% solution in oil)	21.04
<u><sup>1/</sup> Costs based on:</u>	
Labor (\$1.00 per hr.) plus all overhead ...	\$1.24 per hr.
Ammate .....	.15 per lb.
2,4,5-T .....	12.50 per gal.
2,4,-D and 2,4,5-T .....	10.30 per gal.

### General Information

Ammate is manufactured by Du Pont and costs about 15 cents per pound in bulk quantities.

2,4,5-T comes in concentrated liquid form and is manufactured by many chemical companies. The Dow Chemical Co. manufactures it under the trade name of Esteron 245, and American Chemical Paint Co. under the name of Weedone 245-T. It sells for about \$12.50 per gallon.





2,4-D and 2,4,5-T in combination is also marketed by many companies. The Chapman Chemical Company sells it under the name of Brush Killer Ester and the Dow Chemical Company sells it under the name of Esteron Brush Killer. It sells for about \$10.30 per gallon.

Ammate is highly corrosive and all metal containers should be thoroughly washed after use. 2,4-D and 2,4,5-T are not corrosive and may be left in metal containers indefinitely.

The Cornell tool is manufactured by Arthur Annis of Cherry Creek, N.Y.







